



## PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

## Improvements in Belt Drives

We, STEPHENS BELTING COMPANY LIMITED, a British Company of, Snow Hill Birmingham 4, in the County of Warwick, do hereby declare the invention for which we pray

5 a Patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

10 This invention relates to belt drives in which a driving belt passes around two or more pulleys and in the past driving belts can be considered as having fallen into two broad classes.

15 There is the class of belt known as a flat belt which has a generally rectangular cross-section, and the advantages of this class of belt are that it is light and flexible and provides a good grip and also that the use of reinforcing cords of plastics material, such as nylon, can provide a belt of high tensile strength with

20 low weight. However, this class of belt suffers from the disadvantage that the belt tends to run off the pulleys at high speeds or when sudden loads are applied, and if used with a pulley having side flanges the belt tends to

25 ride up one or the other of the side flanges at high speed. The other class of belt is that known as a Vee belt which has a generally "V" cross-section and runs in a "V" groove in the pulley. There are also multiple Vee belts running on pulleys having a number of "V" grooves. These belts have good tracking qualities but are subject to the drawback of considerable weight and stiffness which prevents

30 their being used at high speeds as the centrifugal force due to the weight of the belt tends to cause it to fly off the pulley.

35 The object of this invention is to provide improvements to belt and pulley drives which will overcome the disadvantages of the classes of belt drive referred to above.

40 According to the invention we provide a belt for a belt and pulley drive wherein reinforcing cords are embodied in the cross-section of the belt so as to run longitudinally of the belt in

45 one or more layers which lie on or adjacent

the outer surface of the belt, the tension in such cords being initially adjusted so that at one or more regions over the width of the belt the tension in the cords is less than the tension in the cords over the remainder of the width of the belt.

The expression "outer surface" as used here-in refers to the surface of the belt which is on the outside away from the pulley when the belt is passing around the pulley.

55 With a belt embodying the invention the co-operating pulley would have a raised circumferential region or regions corresponding to the said region or regions of the belt so that when the pulley the said region or regions will in effect form a groove or grooves engaging with the corresponding raised region or regions of the pulley, thus providing a tracking means to prevent the belt from riding off the pulley.

60 In this manner a flat belt having the desirable qualities of low-weight and high strength can also possess the desirable tracking qualities encountered with a Vee belt.

65 For example, the belt may be reinforced with a layer of nylon cords wound into the belt during manufacture and during the initial formation certain cords in the winding would be adjusted so as to have less tension than others, to provide said region or regions of less tension.

70 The invention is illustrated in the accompanying drawings wherein:—

75 Figure 1 is a view showing a section through the pulley and a belt for co-operation therewith in accordance with one embodiment of the invention.

80 Figure 2 is a fragmentary view showing a section through the rim of a pulley and a belt in accordance with another embodiment of the invention.

85 With reference to Figure 1, there is shown diagrammatically, a pulley 10 and a shaft 11 having a rim 12 which is provided with a projecting rib 13 which as shown by way of exam-

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ple, is in the form of an insert strip of rubber or like material fitted into a groove 14 formed in the operative surface 15 of the pulley. However, such projecting member 13 may be

5 formed or provided in any suitable manner such as some of those described in our co-pending application No. 33784/62 (Serial No 1051587) and there may be one or more of the projecting ribs 13.

10 The belt 16 in accordance with this embodiment of the invention, may be formed of leather or other suitable belt material providing the main body 17 of the belt which is reinforced at a position close to the outer surface

15 18 by means of a layer of cords 19 and 20 formed from a suitable plastics material such as nylon.

It will be appreciated that according to the thickness of the body 17 of the belt, there may be more than one such layer, and there may be cords on the surface 18.

When the belt is formed, the tension in the cords 19 adjacent the edges 21 of the belt is adjusted so that over the regions adjacent these edges 21, the tension in the cords 19 is greater than the tension in the cords 20 which occupy the central region of the belt indicated by 22.

A belt thus formed tends to have a slight convexity in the cross-section over the region 22 and when such belt is applied to the pulley 10, the presence of the raised projecting rib 13 will cause the region 22 of the belt to form into a groove co-operating with the rib 13 and thus acting as a tracking means to prevent any tendency for the belt to ride off the pulley.

In the embodiment shown in Figure 2, the rim 23 of the pulley is provided with an operative surface which is of outwardly curved convex form as shown at 24 and the belt 25 for co-operation therewith, is provided with a layer of reinforcing cords in which, during formation of the belt, the tension in the cords is adjusted so that the tension gradually decreases from the outermost cords 26 inwardly to the cords 27 on the central region of the belt, the tension in the cords 27 having minimum tension so that when such belt is used with the convex surface pulley, the belt readily conforms to the surface of the pulley and there is provided a tracking means to prevent the belt from riding off the pulley.

#### WHAT WE CLAIM IS:—

1. A belt for a belt and pulley drive wherein reinforcing cords are embodied in the cross-section of the belt so as to run longitudinally of the belt in one or more layers which lie on or adjacent the outer surface of the belt, the tension in such cords being initially adjusted so that at one or more regions over the width of the belt the tension in the cords is less than the tension in the cords over the remainder of the width of the belt.

2. A belt and pulley drive having a belt in accordance with Claim 1 and a pulley having on its operative surface a raised circumferentially extending region or regions corresponding to the said region or regions of the belt so that when the belt conforms to the outer surface of the pulley, the said region or regions of the belt form a groove or grooves engaging the corresponding raised region or regions of the pulley.

3. A belt in accordance with Claim 1 wherein the tension in the cords is constant over the regions adjacent the edges of the belt whilst over the central regions of the belt the tension in the cords is gradually decreased from one side towards the central plane and then gradually increases from the central plane to the other side.

4. A belt according to Claim 1 wherein the tension in the cords is adjusted so as to decrease gradually from each edge of the belt towards the central plane to enable such belt to conform substantially to the operative surface of a pulley having an outwardly transversely convex form on its operative surface.

5. A belt for a belt and pulley drive substantially as described with reference to and as shown in Figure 1 of the accompanying drawings.

6. A belt for a belt and pulley drive substantially as described with reference to and as shown in Figure 2 of the accompanying drawings.

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